



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/502,052	01/07/2005	Xavier Fanton	255861US0PCT	2511
22850	7590	09/16/2011	EXAMINER	
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314			BRAYTON, JOHN JOSEPH	
			ART UNIT	PAPER NUMBER
			1724	
			NOTIFICATION DATE	DELIVERY MODE
			09/16/2011	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/502,052	<b>Applicant(s)</b> FANTON ET AL.	
	<b>Examiner</b> John Brayton	<b>Art Unit</b> 1724	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 August 2011.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 5) ☒ Claim(s) 1,2,5-18,20,21 and 23-28 is/are pending in the application.
- 5a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 1, 2, 5-18, 20, 21, 23-28 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Claims Pending***

1. Claims 1, 2, 5-18, 20, 21, 23-28 are pending.

### ***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 23, 2011 has been entered.
3. Applicant's affidavit filed August 23, 2011 under 37 C.F.R. 1.132 has been entered, but does not overcome the rejections below.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

Art Unit: 1724

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
6. Claims 1, 2, 15, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Narita (JP 62-297451) in view of Lin (US 6,521,098).

Regarding claim 1, Applicant discloses the target is formed using an intimate blend of nickel oxide and nickel powders in order to form the target, the intimate blend would have a desired electrical resistivity (Applicant's disclosure pg. 5, ln. 24-29, pg. 6, ln. 30-38).

Narita teaches an essentially ceramic target being spray coated and comprising predominantly nickel oxide  $\text{NiO}_x$  wherein the nickel oxide is oxygen deficient with respect to the stoichiometric composition  $\text{NiO}_x$  wherein  $x$  is less than 1 (Abstract of Narita).

When the structure recited in the reference is substantially identical to that of the claims the claimed properties or function are presumed inherent. MPEP 2112.01. Because the prior art exemplifies the applicant's claimed nickel oxide target, the claimed physical properties relating to the electrical resistivity of less than 10 ohm-cm is inherently present in the prior art. Absent an objective showing to the contrary, the addition of the claimed physical properties to the claim language fails to provide patentable distinction over the prior art of record, meeting the requirements of claim 1.

Narita does not explicitly teach a target where the target deposits film within a magnetically enhanced sputtering device. The Examiner takes the position that Narita is capable of being used as a sputtering target because a predominantly nickel oxide mass may be sputtered.

Lin teaches an essentially ceramic target comprised predominantly of nickel oxide that deposits film within a magnetically enhanced sputtering device (col. 9, ln. 12-41) because it would deposit a nickel oxide film with a desired crystal orientation (col. 9, ln. 15-17).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the target of Narita to provide a target within a magnetically enhanced sputtering device, as taught by Lin, because it would deposit a nickel oxide film with a desired crystal orientation (col. 9, ln. 15-17).

Regarding claim 2, Narita teaches a target wherein the stoichiometric deficiency stems from the composition of the intimate blend formed by nickel oxide powders and nickel powders (Abstract of Narita).

Regarding claims 23 and 24, as discussed above the resistance of the target is an inherent property so long as the requirements of the structure of the target are met. MPEP 2112.01. Since Narita teaches the features as required by Applicant, the electrical resistivity of the target would be inherent. Therefore the target having an electrical resistivity of less than 1 ohm-cm or less than 0.1 ohm-cm is inherent and taught by Narita.

Regarding claim 15, Narita and Lin teach the use of ceramic nickel target recited in claim 1. Lin teaches a process for manufacturing a thin layer of nickel oxide using magnetically enhanced sputtering (col. 9, ln. 12-40).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the target Narita by providing a process for manufacturing a

Art Unit: 1724

thin layer of nickel oxide using magnetically enhanced sputtering, as taught by Lin, because it would form a thin layer of nickel oxide with a desired crystal orientation (col. 9, ln. 15-17).

7. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Narita and Lin as applied to claim 1 above, and further in view of Kida (US 6,193,856).

Regarding claim 27, Narita teaches nickel oxide powder is spray coated onto a substrate (Abstract of Narita).

Narita does not explicitly teach the substrate is metal.

Kida teaches spray coating a metal oxide powder that is deficient in oxygen onto a metal substrate (col. 4, ln. 1-15, 58-59).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the target of Takao by providing spray coating onto a metal substrate, as taught by Kida, because it would not require a molding step, a sintering step, a processing step to form a complex structure or shape (col. 4, ln. 20-22 of Kida).

Regarding claim 28, Narita teaches nickel and nickel oxide powders are spray coated onto substrate (Abstract of Narita), but does not explicitly teach the substrate is metal.

Kida also teaches spray coating a nickel powder onto a metal substrate (col. 5, ln. 7-25).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the substrate of Narita by spray coating onto a metal

Art Unit: 1724

substrate, as taught by Kida, because it would not require a molding step, a sintering step, a processing step to form a complex structure or shape (col. 4, ln. 20-22 of Kida).

8. Claims 1, 2, 15, 23, 24, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takao (US 4,107,019) in view of Lin (US 6,521,098) and Kida (US 6,193, 856).

Regarding claim 1, Applicant discloses the target is formed using an intimate blend of nickel oxide and nickel powders in order to form the target, the intimate blend would have a desired electrical resistivity (Applicant's disclosure pg. 5, ln. 24-29, pg. 6, ln. 30-38).

Takao teaches a target comprising  $\text{NiO}_x$  capable of depositing film within a sputtering device (col. 8, ln. 25-30). Takao discloses blending nickel oxide powder and nickel powder to form a target. This blending would result in a target with a stoichiometric composition deficient in oxygen. The target would therefore inherently have a property of electrical resistivity of 10 ohm-cm or less.

Takao does not explicitly teach a target that is comprised predominantly of nickel oxide or a magnetically enhanced sputtering device for sputtering a nickel oxide target.

Lin teaches an essentially ceramic target comprised predominantly of nickel oxide capable of depositing film within a magnetically enhanced sputtering device (col. 9, ln. 12-41).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the target of Takao to provide an essentially ceramic target comprising predominantly nickel oxide in a magnetically enhanced sputtering device, as

Art Unit: 1724

taught by Lin, because it would deposit a nickel oxide film with a desired crystal orientation (col. 9, ln. 15-17).

Neither Takao nor Lin explicitly teach the target is formed by spray coating.

Kida teaches spray coating a metal oxide powder that is deficient in oxygen onto a metal substrate (col. 4, ln. 1-15, 58-59). Kida also teaches spray coating a nickel powder onto a metal substrate (col. 5, ln. 7-25).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the target of Takao by providing spray coating the target, as taught by Kida, because it would not require a molding step, a sintering step, a processing step to form a complex structure or shape (col. 4, ln. 20-22 of Kida).

Regarding claim 2, Takao teaches a sputtering target wherein the stoichiometric deficiency stems from the composition of the intimate blend formed by nickel oxide powders and nickel powders (col. 8, ln. 25-30).

Regarding claims 23 and 24, as discussed above the resistance of the target would be an inherent property so long as the requirements of the structure of the target are met. MPEP 2112.01. Since Takao teaches the features as required by Applicant, properties of the target would be inherent. Therefore the target having an electrical resistivity of less than 1 ohm-cm or less than 0.1 ohm-cm are inherent to the target of Takao modified by Lin.

Regarding claim 15, Takao and Lin teach the use of ceramic nickel target recited in claim 1. Takao teaches a process for manufacturing a thin layer of nickel oxide using



Art Unit: 1724

sputtering (col. 8, ln. 25-30), but does not explicitly teach magnetically enhanced sputtering.

Lin teaches a process for manufacturing a thin layer of nickel oxide using magnetically enhanced sputtering (col. 9, ln. 12-40).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Takao and Lin by providing a process for manufacturing a thin layer of nickel oxide using magnetically enhanced sputtering, as taught by Lin, because it would form a thin layer of nickel oxide with a desired crystal orientation (col. 9, ln. 15-17).

Regarding claim 27, Takao teaches nickel and nickel oxide powders used to form a target, but neither Takao nor Lin explicitly teach nickel oxide powder or a nickel powder spray coated onto a metal substrate.

Kida teaches spray coating a metal oxide powder that is deficient in oxygen onto a metal substrate (col. 4, ln. 1-15, 58-59).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the target of Takao by providing nickel oxide powder is spraying coated onto a metal substrate, as taught by Kida, because it would not require a molding step, a sintering step, a processing step to form a complex structure or shape (col. 4, ln. 20-22 of Kida).

Regarding claim 28, Takao teaches nickel and nickel oxide powders used to form a target, but neither Takao nor Lin explicitly teach nickel oxide powder or a nickel powder spray coated onto a metal substrate.

Kida teaches spray coating a metal oxide powder that is deficient in oxygen onto a metal substrate (col. 4, ln. 1-15, 58-59). Kida also teaches spray coating a nickel powder onto a metal substrate (col. 5, ln. 7-25).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the target of Takao by providing nickel oxide powder is spraying coated onto a metal substrate, as taught by Kida, because it would not require a molding step, a sintering step, a processing step to form a complex structure or shape (col. 4, ln. 20-22 of Kida).

9. Claims 1, 2, 15, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takao (US 4,107,019) in view of Lin (US 6,521,098).

Regarding claim 1, Applicant discloses the target is formed using an intimate blend of nickel oxide and nickel powders in order to form the target, the intimate blend would have a desired electrical resistivity (Applicant's disclosure pg. 5, ln. 24-29, pg. 6, ln. 30-38).

Takao teaches a target comprising  $\text{NiO}_x$  capable of depositing film within a sputtering device (col. 8, ln. 25-30). Takao discloses blending nickel oxide powder and nickel powder to form a target. This blending would result in a target with a stoichiometric composition deficient in oxygen. The target would therefore inherently have a property of electrical resistivity of 10 ohm-cm or less.

Takao does not explicitly teach a target that is comprised predominantly of nickel oxide or a magnetically enhanced sputtering device for sputtering a nickel oxide target.

Lin teaches an essentially ceramic target comprised predominantly of nickel oxide capable of depositing film within a magnetically enhanced sputtering device (col. 9, ln. 12-41).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the target of Takao to provide an essentially ceramic target comprising predominantly nickel oxide in a magnetically enhanced sputtering device, as taught by Lin, because it would deposit a nickel oxide film with a desired crystal orientation (col. 9, ln. 15-17).

Applicant's limitation that the target is formed by spray coating is regarded as a method of forming the target. A method of forming the device is not germane to the issue of patentability of the device itself. A product-by-process claim that describes the product that is the same as the prior art product is unpatentable even though prior art product is made by process different from that recited in claims. MPEP 2113. Therefore this limitation has not been given patentable weight.

Regarding claim 2, Takao teaches a sputtering target wherein the stoichiometric deficiency stems from the composition of the intimate blend formed by nickel oxide powders and nickel powders (col. 8, ln. 25-30).

Regarding claims 23 and 24, as discussed above the resistance of the target would be an inherent property so long as the requirements of the structure of the target are met. MPEP 2112.01. Since Takao teaches the features as required by Applicant, properties of the target would be inherent. Therefore the target having an electrical

Art Unit: 1724

resistivity of less than 1 ohm-cm or less than 0.1 ohm-cm are inherent to the target of Takao modified by Lin.

Regarding claim 15, Takao and Lin teach the use of ceramic nickel target recited in claim 1. Takao teaches a process for manufacturing a thin layer of nickel oxide using sputtering (col. 8, ln. 25-30), but does not explicitly teach magnetically enhanced sputtering.

Lin teaches a process for manufacturing a thin layer of nickel oxide using magnetically enhanced sputtering (col. 9, ln. 12-40).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Takao and Lin by providing a process for manufacturing a thin layer of nickel oxide using magnetically enhanced sputtering, as taught by Lin, because it would form a thin layer of nickel oxide with a desired crystal orientation (col. 9, ln. 15-17).

10. Claims 5, 6, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takao and Lin as applied to claim 1 above, in view of Arai et al (US 5,981,092 as cited in IDS).

Regarding claims 5 and 6, neither Takao nor Lin explicitly teach a minority element alloyed to nickel oxide.

Arai teaches a composite target (col. 3, ln. 66) comprised of predominantly of NiO (col. 4, ln. 38) with a minority element less than 50 atomic % (col. 4, ln. 43-67).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao and Lin, wherein nickel oxide is alloyed

Art Unit: 1724

with a minority element less than 50 atomic %, as taught by Arai, because it would lower the resistivity and increase the quality of the film (col. 4, ln. 47-50).

Regarding claims 25 and 26, neither Takao nor Lin explicitly teach the atomic percentage of the minority element is less than 30% or less than 20% calculated with respect to the nickel.

Arai teaches a sputtering target of NiO having a minority element of Boron with a volume percent of 8% compared to Nickel Oxide (col. 13, ln. 47-50). The Examiner takes the position that Arai teaches the atomic percentage of the minority element is less than 30%, or less than 20% calculated with respect to the nickel.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao and Lin by providing the atomic percentage of the minority element is less than 30% or less than 20% calculated with respect to the nickel, because it would lower the resistivity (col. 4, ln. 45-50).

11. Claims 7-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takao, Lin and Arai as applied to claim 5 above in view of Campet et al. (US 5,522,976).

Regarding claim 7 and 8, neither Takao, Lin nor Arai explicitly teach a minority element whose oxide is an electroactive material with anodic coloration. Nor does it teach minority elements of Co, Ir, Ru, or Rh. Takao as modified by Arai teaches a nickel oxide target alloyed with a minority element.

Campet is directed to a target for cathode sputtering. It teaches a target compound of NiO alloyed with a minority element from the metals of groups I-VIII of the

Art Unit: 1724

Periodic table, these groups include minority elements consisting of Co, Ir, Ru, or Rh (col. 2, ln. 30-36).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao, Lin and Arai by alloying with a minority element from the group of Co, Ir, Ru, or Rh, as taught by Campet, because it would allow these solid materials having the desired properties to be sputtered and form a high melting point target compound (col. 1, ln. 24-30).

Applicant discloses minority elements whose oxide is an electroactive material with anodic coloration, such as for example Co, Ir, Ru, and Rh or from those belonging to column one of the Periodic table (for example H, Li, K and Na; Applicant's disclosure pg. 6, ln. 11-18). Since Campet teaches a minority element from the group of Co, Ir, Ru, or Rh, the Examiner takes the position that an oxide of one of these minority elements is inherently an electroactive material of anodic coloration.

Regarding claims 9 and 10, neither Takao, Lin nor Arai teach minority elements whose oxide is an electroactive material with cathodic coloration. Nor do they teach minority elements of Mo, W, Re, Sn, In, Bi, or mixtures thereof.

Campet is directed to target for cathode sputtering. It teaches a target compound of NiO alloyed with a minority element from the metals of groups I-VIII of the Periodic table, these groups include minority elements consisting of Mo, W, Re, Sn, In, Bi (col. 2, ln. 30-36).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao, Lin and Arai by alloying with a minority

Art Unit: 1724

element from the group of Mo, W, Re, Sn, In, Bi as taught by Campet, because it would allow these solid materials having the desired properties to be sputtered and form a high melting point target compound (col. 1, ln. 24-30).

Applicant discloses “minority elements whose oxide is an electroactive material with cathodic coloration, chosen from the group of Mo, W, Re, Sn, In, Bi” (Applicant’s disclosure pg. 6, ln. 19-24). Campet teaches a minority element from the group of Mo, W, Re, Sn, In, Bi, the Examiner takes the position that an oxide of one of these minority elements is inherently an electroactive material of cathodic coloration.

Regarding claims 11 and 12, neither Takao, Lin nor Arai teach minority elements selected from the elements belonging to column one of the periodic table.

Campet is directed to a target for cathode sputtering. It teaches a target compound of NiO alloyed with a minority element from the metals of group I of the Periodic table. Group I includes minority elements of H, Li, K and Na (col. 2, ln. 30-36).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao, Lin and Arai by alloying with a minority element from Group I of the Periodic table, as taught by Campet, because it would allow these solid materials having the desired properties to be sputtered and form a high melting point target compound (col. 1, ln. 24-30).

Regarding claims 13 and 14, neither Takao, Lin nor Arai teach minority elements selected from the elements belonging to column one of the periodic table.

Campet is directed to a target for cathode sputtering. It teaches a target compound of Ni alloyed with a minority element that is a metal or an alkaline earth or a

Art Unit: 1724

semiconductor. Campet also teaches a minority element selected from the group consisting of Ta, Zn, Zr, Al, Si, Sb, U, Be, Mg, Ca, V, or Y (col. 2, ln. 30-36).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao, Lin and Arai by alloying with a minority element from the group consisting of Ta, Zn, Zr, Al, Si, Sb, U, Be, Mg, Ca, V, or Y (col. 2, ln. 30-36), as taught by Campet, because it would allow these solid materials having the desired properties to be sputtered and form a high melting point target compound (col. 1, ln. 24-30).

Applicant discloses a minority element selected from the group consisting of Ta, Zn, Zr, Al, Si, Sb, U, Be, Mg, Ca, V, Y is a metal or an alkaline earth or a semiconductor, wherein the hydrated or hydroxylated oxide of which is protonically conductive (Applicant's disclosure pg. 6, ln. 25-30). Since Campet teaches a minority element from the group of Ta, Zn, Zr, Al, Si, Sb, U, Be, Mg, Ca, V, or Y the Examiner takes the position that the hydrated or hydroxylated oxide of one of these minority elements would be protonically conductive.

12. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takao and Lin as applied to claim 15 above, in view of Hashimoto et al (US 5,831,760).

Regarding claim 16, Takao and Lin teach a nickel oxide layer formed by sputtering a nickel oxide target. Nickel oxide is an electrochromic material that exhibits anodic coloration. Neither Takeo nor Lin explicitly teach an oxidative colored electrochromic material comprised of nickel oxide.



Hashimoto teaches an oxidative colored electrochromic layer comprised of nickel oxide (col. 4, ln. 37-49).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Takao and Lin by producing an electrochromic material having an anodic coloration as a thin layer based on nickel oxide, because it would provide a layer with good optical properties and repeated durability (col. 4, ln. 42-45 of Hashimoto).

Regarding claim 17, Takao and Lin teach a nickel oxide layer formed by sputtering a nickel oxide target. Neither Takao nor Lin explicitly teach an electrochemical device comprising a substrate provided with a stack of functional layers.

Hashimoto teaches an electrochemical device comprising a substrate provided with a stack of functional layers (Figures 1-6, Abstract of Hashimoto), including a layer based on nickel oxide (col. ln. 37-49).

The Examiner takes the position that the recitation “capable of” performs a function and is not a positive limitation but only requires the ability to so perform. Therefore the language “capable of reversibly and simultaneously inserting ions of the  $H^+$ ,  $Li^+$ , or  $OH^-$  type and electrons” is not given patentable weight.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao and Lin to provide an electrochemical device comprising a substrate provided with a stack of functional layers including a layer based on nickel oxide, as taught by Hashimoto, because it would provide a layer with good optical properties and repeated durability (col. 4, ln. 42-45 of Hashimoto).

Regarding claim 18, Takao and Lin teach a nickel oxide layer formed by sputtering a nickel oxide target. Takao and Lin do not explicitly teach an electrochemical device comprising a substrate provided with a stack of functional layers.

Hashimoto teaches an electrochemical device comprising a substrate provided with a stack of functional layers (Figures 1-6, Abstract of Hashimoto), including a layer based on nickel oxide, said layer being alloyed with a minority element consisting of a material whose oxide is an electroactive material with anodic coloration (col. In. 37-49).

The Examiner takes the position that the recitation "capable of" performs a function and is not a positive limitation but only requires the ability to so perform. Therefore the language "capable of reversibly and simultaneously inserting ions of the H<sup>+</sup>, Li<sup>+</sup>, or OH<sup>-</sup> type and electrons" is not given patentable weight.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao and Lin by providing an electrochemical device comprising a substrate provided with a stack of functional layers, including a layer based on nickel oxide, said layer being alloyed with a minority element consisting of a material whose oxide is an electroactive material with anodic coloration, as taught by Hashimoto, because it would provide a layer with good optical properties and repeated durability (col. 4, In. 42-45 of Hashimoto)

The properties of the layer being an electrochemically active layer with a minority element consisting of a material whose oxide is an electroactive material with anodic coloration are inherent to a nickel oxide layer with a minority element consisting of Co, Ir Ru or Rh, as disclosed by Applicant on page 6, In. 11-18.

Art Unit: 1724

13. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takao, and Lin as applied to claim 1 above, in view of IBM Technical Disclosure: Thermally Stable Thin Film Capacitor, February 1967.

Regarding claim 20, Takao, and Lin teach a nickel oxide layer formed by sputtering a nickel oxide target. Neither Takao, nor Lin explicitly teach an electrochemical device comprising a substrate provided with a stack of functional layers.

The IBM Tech. Disclosure teaches an electrochemical device comprising at least one carrier substrate provided with a stack of functional layers, including at least one electrochemically active layer, capable of reversibly and simultaneously inserting ions, of the H.sup.+, Li.sup.+ or OH.sup.- type, and electrons, wherein said electrochemically active layer is based on nickel oxide, said layer being alloyed with a minority element selected from the elements belonging to the column one of the Periodic Table, said layer being obtained from a sputtering target.

The Examiner takes the position that the recitation “capable of” performs a function and is not a positive limitation but only requires the ability to so perform. Therefore the language “capable of reversibly and simultaneously inserting ions of the H+, Li+, or OH- type and electrons” is not given patentable weight.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao and Lin by providing an electrochemical device with a stack of functional layers including at least one electrochemically active layer based on nickel oxide alloyed with a minority element selected from column one of the Periodic Table, because it would produce a device with a high capacitance per unit

area and maintain stability during and after exposure to high temperature environments (IBM Tech. Disclosure pg. 1).

14. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takao and Lin as applied to claim 1 above in view of Van Der Sluis (US 5,905,590).

Regarding claim 21, Takao, and Lin teach a nickel oxide layer formed by sputtering a nickel oxide target. Neither Takao nor Lin explicitly teach an electrochemical device comprising a substrate provided with a stack of functional layers.

Van Der Sluis teaches an electrochemical device comprising at least one carrier substrate (figure 1, 3) provided with a stack of functional layers (Figure 1; reference numbers 5, 7, 9, 11, 13) including at least one electrochemically active layer (col. 4, In 4-30), capable of reversibly and simultaneously inserting ions, of the H.sup.+, Li.sup.+ or OH.sup.- type, and electrons, wherein said electrochemically active layer is a metal or an alkaline earth or a semiconductor, the hydrated or hydroxylated oxide of which is protonically conducted by sputtering (col. 4, In. 25-26).

Since Van Der Sluis teaches a layer of a metal or an alkaline earth or a semiconductor, the properties of this layer wherein the hydrated or hydroxylated oxide of the layer would be capable of protonically conducting are inherent. Therefore the hydrated or hydroxylated oxide of the layer taught by Van Der Sluis would be capable of protonically conducting.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao and Lin with an electrochemical device comprising at least one carrier substrate provided with a stack of functional layers,

Art Unit: 1724

including at least one electrochemically active layer, capable of reversibly and simultaneously inserting ions, of the H.sup.+, Li.sup.+ or OH.sup.- type, and electrons, wherein said electrochemically active layer is a metal or an alkaline earth or a semiconductor, the hydrated or hydroxylated oxide of which is protonically conducted, as taught by Van Der Sluis, because it would allow use of solid state electrolytes therefore eliminating sealing problems and making the device easier to handle (col. 4, ln. 4-6).

15. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takao and Lin as applied to claim 1 above, in view of Kida (US 6,193, 856).

Regarding claim 27, Takao teaches nickel and nickel oxide powders used to form a target, but neither Takao nor Lin explicitly teach nickel oxide powder or a nickel powder spray coated onto a metal substrate.

Kida teaches spray coating a metal oxide powder that is deficient in oxygen onto a metal substrate (col. 4, ln. 1-15, 58-59).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the target of Takao by providing nickel oxide powder is spraying coated onto a metal substrate, as taught by Kida, because it would not require a molding step, a sintering step, a processing step to form a complex structure or shape (col. 4, ln. 20-22 of Kida).

Regarding claim 28, Takao teaches nickel and nickel oxide powders used to form a target, but neither Takao nor Lin explicitly teach nickel oxide powder or a nickel powder spray coated onto a metal substrate.

Kida teaches spray coating a metal oxide powder that is deficient in oxygen onto a metal substrate (col. 4, ln. 1-15, 58-59). Kida also teaches spray coating a nickel powder onto a metal substrate (col. 5, ln. 7-25).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the target of Takao by providing nickel oxide powder is spraying coated onto a metal substrate, as taught by Kida, because it would not require a molding step, a sintering step, a processing step to form a complex structure or shape (col. 4, ln. 20-22 of Kida).

### ***Response to Arguments***

16. Applicant's arguments filed January 20, 2011 have been fully considered but they are not persuasive.

Applicant argues that the rejection made of Takao and Lin is improper and should be removed.

The Examiner disagrees. Applicant's limitation that the target is formed by spray coating is regarded as a method of forming the target. Further, Applicant only recites that "a target being spray coated". There isn't any claim language that defines what part of the target is being spray coated or what the spray coating is or how it affects the structure of the target. Additionally, it cannot be determined when the spray coating applied such as before, during or after the target is sputtered. A method of forming the device is not germane to the issue of patentability of the device itself. A product-by-process claim that describes the product that is the same as the prior art product is unpatentable even though prior art product is made by process different from that

Art Unit: 1724

recited in claims. MPEP 2113. Therefore this limitation has not been given patentable weight.

Applicant attempts to distinguish a spray coated target over a sintered coated target by way of the declaration under Rule 132 fails for the following reasons. The spray coating described in the declaration is a general one, no spray coating conditions are provided to achieve the declared target density of 95-97%. Additionally in order to distinguish that the method of spray coating is patentable over a sintered target the Applicant must show that the differences are significant and unexpected. No unexpected results are found in the improved spray coated target because targets with densities in the range declared by Applicant would be expected to have properties such as lower impurities, less arc discharge and quicker degassing. Therefore the rejections above are maintained.

Applicant argues that Kida does not compensate for Takao and Lin's deficiencies because it does not teach a ceramic layer containing Ni, and Kida does not disclose a NiO ceramic layer.

In response to applicant's arguments against the Kida reference individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant submits that Takao does not teach a target that is comprised predominately of nickel oxide or a magnetically enhanced sputtering device for a sputtering a nickel oxide target.

The Examiner takes the position that a magnetically enhance sputtering device for sputtering is well known and taught by Lin cited above. Additionally, Takao is directed to depositing a layer of Ni-NiO with the metal percentage ranging from 1-99% nickel (col. 4, ln. 43-50) using a substoichiometric nickel oxide target. Therefore, although Takao does not explicitly teach a target comprised predominately of nickel oxide it is directed to such a target and could even suggest such a target.

Applicant argues that Takao does not teach the required oxygen deficient NiOx powder mixture of the claimed invention because Applicant's target is one chemical compound in which atoms are covalently linked.

The Examiner disagrees because Applicant's substoichiometry depends from the intimate blending of nickel and nickel oxide powders. The Examiner cannot find factual support in Applicant's disclosure that indicates Applicant's invention would achieve a covalent link or bond and encourages Applicant to submit factual support for their arguments.

Applicant submits that Takao's mixture would be expected to have different properties such as different conductivity.

The Examiner disagrees because when the structure recited in the reference is substantially identical to that of the claims the claimed properties or function are presumed inherent. MPEP 2112.01. Because the prior art exemplifies applicant's



Art Unit: 1724

claimed oxygen deficient nickel oxide target, the claimed physical properties relating to the conductivity are inherently present in the prior art. Absent an objective showing to the contrary, the addition of the claimed physical properties to the claim language fails to provide patentable distinction over the prior art of record, meeting the requirements of claims above.

Applicant argues that there is no evidence in Takao's powder that the nickel oxide is oxygen deficient.

The Examiner disagrees. Takao's target contains a nickel oxide powder and a nickel powder. Takao's target is deficient in oxygen because there is nickel added to the target. The Examiner believes this is identical to Applicant's disclosure filed July 30, 2004 on page 7, lines 13-15 which states that the lack of stoichiometry may stem from the composition of the intimate blend formed by nickel oxide powders and nickel powders, this embodiment is also recited in claim 2.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Brayton whose telephone number is (571)270-3084. The examiner can normally be reached on 7:30 a.m. - 5:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on (571) 272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1724

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rodney G. McDonald/  
Primary Examiner, Art Unit 1724

/J. B./  
Examiner, Art Unit 1724